

JOB NO.:

IGS01-02

W.O. #01-19846-00

TITLE:

HP Turbine Dense Pack Modification

DESCRIPTION:

This modification involves changing the existing double-flow high pressure (HP) nozzle box to a single flow design. This will make room in the turbine for additional stages to the HP turbine and increase section efficiency.

JUSTIFICATION:

ECONOMIC

PAYBACK PERIOD:

0.48 years

BENEFIT/COST RATIO:

23

ECONOMIC LIFE:

20 years

PV SAVINGS:

\$78,500,000

ADDITIONAL DETAIL:

Both GE and Alstom are currently offering HP turbine upgrades that would improve section efficiency by 2 percent or more. This increased efficiency would allow for increased generation without increasing fuel input and environmental emissions. This modification will also facilitate future increases in unit capacity by enlarging the steam flow capacity of the turbine control stage. This potential increase will result in additional savings in the near future. This modification has been made to other large coal fired plants and is scheduled for many more before our units are completed.

COST ESTIMATE:

	<u>2001-2002</u>	<u>2002-2003</u>
Engineering Labor	\$5,000	\$5,000
Installation Labor	\$0	\$0
Contractor Labor	\$0	\$0
Material	<u>\$5,500,000</u>	<u>\$4,500,000</u>
Job Total	\$5,505,000	\$4,505,000

EFFECT OF DEFERRAL:

Additional revenue from increased generation will be lost.

IP7008595

DETAILS OF ECONOMICS: Economic assumptions:

1. Economic life: 20 years (PV of Annuity Factor 11.2)
2. Hours of operation/year: 8340 (8760 - 2.5 weeks average outage)
3. Cost of money: 6.35 percent
4. Cost of generation: \$42,000/ unit hour (\$48.00/MW hr)
5. Avoided cost of maintenance during 2002 outage: \$708,000
6. Avoided cost of lost generation to rehabilitate the hp nozzle: \$1,944,000 (3 days of estimated 10 required)

Additional Generation Capacity at Existing Steam Flow:

Additional potential revenue $(2.0\%)(875\text{MW})(\$48.00/\text{MW hr})(8340 \text{ hrs/yr}) = \$7,005,600$

Payback: $\$3,348,000 (6,000,000 - \text{items 5\&6})/\$7,005,600 = 0.48 \text{ years}$

Benefit/Cost Ratio: $(7,005,600)(11.2)/(3,348,000) = 23.4$

PROJECT HISTORY: None, first year of project.

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COST ESTIMATE:

	<u>2001-2002</u>	<u>2002-2003</u>
Engineering Labor	\$ 5,000	5,000
Installation Labor	\$ 0	0
Contractor Labor	\$ 0	0
Material	\$ <u>5,500,000</u>	<u>4,500,000</u>
Job Total	\$5,505,000	4,505,000

IP7008597

EFFECT OF DEFERRAL:

Additional revenue from increased generation will be lost.

DETAILS OF ECONOMICS:

Economic assumptions:

- 1- Economic life: 20 years (PV of Annuity Factor 11.2)
- 2- Hours of operation/year: 8340 (8760 - 2.5 weeks ave.outage)
- 3- Cost of money: 6.35%
- 4- Cost of generation: \$42,000/ unit hour (\$48.00/MW hr)
- 5- Avoided cost of maintenance during 2002 outage: \$708,000
- 6- Avoided cost of lost generation to rehab the hp nozzle: \$1,944,000 (3 days of estimated 10 required)

Additional Generation Capacity at Existing Steam Flow:

Additional potential revenue $(2.0\%)(875\text{MW})(\$48.00/\text{MW hr})(8340 \text{ hrs/yr}) = \$7,005,600$

Payback: $\$3,348,000 (6,000,000 - \text{items 5\&6})/\$7,005,600 = 0.48 \text{ years}$

Benefit/Cost Ratio: $(7,005,600)(11.2)/(3,348,000) = 23.4$

PROJECT HISTORY:

None, first year of project.